इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 12155 (1987): General and Safety Requirements for Fans and Regulators for Household and Similar Purposes [ETD 5: Electric Fans]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 12155 - 1987

(Reaffirmed 1999)

Indian Standard

GENERAL AND SAFETY REQUIREMENTS FOR FANS AND REGULATORS FOR HOUSEHOLD AND SIMILAR PURPOSES

UDC 621-63 + 621-316-7 : 614-8

© *Copyright* 1988

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 4

March 1988

Indian Standard

GENERAL AND SAFETY REQUIREMENTS FOR FANS AND REGULATORS FOR HOUSEHOLD AND SIMILAR PURPOSES

Electric Fans Sectional Committee, ETDC 5

Chairman
PROF J. K. CHOUDHURY
Jadavpur University, Calcutta

Members	*Representing*
LT-CDR V. K. AHUJA	Naval Headquarters, Ministry of Defence
LT-CDR R. SINGH (*Alternate*)	
SHRI S. K. BANDOPADHYAY	Jay Engineering Works Ltd, New Delhi
SHRI C. GROVER (*Alternate*)	
CHIEF ENGINEER (ELECTRICAL)-I	Central Public Works Department, New Delhi
SURVEYOR OF WORKS (ELECTRICAL)-I (*Alternate*)	
DR R. N. DHAR	National Physical Laboratory (CSIR), New Delhi
SHRI K. L. GARG	Directorate General of Supplies & Disposals (Inspection Wing), New Delhi
SHRI R. P. SEHGAL (*Alternate*)	
SHRI S. N. GHOSH	Confederation of Engineering Industry, New Delhi
JOINT DIRECTOR STANDARDS (ELECTRICAL)/7	Railway Board, Ministry of Transport (Dept of Railways)
ASSISTANT DIRECTOR STANDARDS (ELECT) D-l (*Alternate*)	
SHRI V. K. MAINI	Fan Makers' Association of India, Calcutta
SHRI S. H. MANE	Crompton Greaves Ltd, Bombay
SHRI D. G. DATEY (*Alternate*)	
SHRI B. MUKHOPADHYAY	National Test House, Calcutta
SHRI J. P. SRIVASTAVA (*Alternate*)	
SHRI M. V. S. RAO	Engineer-in-Chief's Branch, Ministry of Defence
SHRI H. S. PANESAR (*Alternate*)	
SHRI N. C. SAHA	Khaitan Fans Pvt Ltd, Calcutta
SHRI K. C. SHARMA	Directorate General of Technical Development, New Delhi
SHRI K. L. NANGIA (*Alternate*)	

(*Continued on page* 2)

© *Copyright* 1988

BUREAU OF INDIAN STANDARDS

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(*Continued from page* 1)

Members	*Representing*
SHRI S. K. SHARMA	American Universal, Faridabad
SHRI G. S. SRIVASTAVA	Metallurgical & Engineering Consultants (India) Ltd, Ranchi
SHRI J. P. GUPTA (*Alternate*)	
SHRI S. P. SACHDEV, Director (Elec tech) (*Secretary*)	Director General, BIS (*Ex-officio Member*)

Indian Standard

GENERAL AND SAFETY REQUIREMENTS FOR FANS AND REGULATORS FOR HOUSEHOLD AND SIMILAR PURPOSES

0. FOREWORD

0.1 This Indian Standard was adopted by the Bureau of Indian Standards on 1 July 1987, after the draft finalized by the Electric Fans Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 A large number of Indian Standards have been published to cover the requirements of different types of fans. To maintain uniformity and to avoid repetition in every individual standard, a need has been felt to have a consolidated standard on general and safety requirements of fans and this standard is being prepared to meet this need. It is intended that ultimately individual standards on different types of fans will refer to this standard so far as general and safety requirements are concerned.

0.3 This standard is to be read in conjunction with IS : 302-1979*. For the sake of convenience, the clauses of this standard correspond to those of IS : 302-1979*. Clauses which are applicable or not applicable and necessary changes, wherever required, are indicated accordingly. Clauses/sub-clauses which are additional to those of IS : 302-1979* are numbered starting from **101.**

0.4 In preparing this standard, assistance has been derived from IEC Pub 342-1 (1981), 342-2 (1982) and 342-3 (1982) Safety requirements for electric fans and regulators:

Part 1 Fans and regulators for household and similar purposes

Part 2 Fans and regulators for use in ships

Part 3 Jet fans

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

---

*General and safety requirements for household and similar electrical appliances (*fifth revision*).

†Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard applies to fans and their associated regulators intended for use on single-phase ac and dc circuits not exceeding 250 V, for household and similar purposes, such as ceiling, table, pedestal, partition and ventilating fans.

NOTE 1 — Wherever applicable, the term 'fan' used in this standard includes its associated regulators, if any.

NOTE 2 — Fans for industrial use are not covered in this standard. However, air circulator type fans and fans for use in ships are covered and additional requirements for such fans are indicated wherever considered necessary.

1.2 This standard does not apply to safety requirements for:

a) fans designed exclusively for industrial purposes;

b) fans intended to be used in locations where special conditions prevail, such as the presence of corrosive or explosive atmosphere (dust, vapour or gas);

c) fans used in refrigerator equipment and air-conditioners;

d) fans for cooling built into special heating appliances, such as ranges, ovens, range hoods and microwave cooking appliances; and

e) hot air fans.

1.3 This standard is concerned with safety and does not cover performance requirements and the corresponding tests.

2. TERMINOLOGY

2.0 In addition to the definitions given in IS : 1885 (Part 55)-1981*, 2 of IS : 302-1979† is applicable except as follows:

Addition:

The term 'appliance' includes fan with its regulators, if any.

2.30 Replacement:

Normal Load — The load obtained when the fan is operated together with ancillary equipment, such as a speed regulator, whether incorporated in or detached from the fan motor assembly, set at highest speed position and when:

---

*Electrotechnical vocabulary: Part 55 Electric fans.

†General and safety requirements for household and similar electrical appliances (*fifth revision*).

a) ceiling, table, air circulator and pedestal type fans are operated continuously in free space with the oscillating mechanism, if any, in operation;

b) partition type fans are operated continuously, with the fan installed in a suitable partition with minimum dimensions of the side equal to 4*D*, where *D* is the diameter of the air inlet; and

c) free inlet, free outlet and fully ducted ventilating fans are operated continuously in a minimum size of duct for which they are designed, with the distance between the fan and the end of the duct being four times the diameter of the fan.

Additional Definitions:

2.101 Clamping Device — The means by which any positioning device, such as, swivel, trunnion, oscillating mechanism, may be held in the desired position.

2.102 Suspension System — The means of attaching the fan system to the ceiling or deckhead.

2.103 Cabin Type Fan — A propeller bladed fan, having two or more blades, driven by an electric motor and intended for use with free inlet and outlet. It may be a table fan or a bracket-mounted fan for bulkhead or deckhead mounting.

3. GENERAL REQUIREMENT

3.0 3 of IS : 302-1979* is applicable except as follows:

Additional Sub-clauses:

3.101 General requirements for equipment in ships are given in IS : 10242 (Part 1/Sec 1)-1982†.

3.102 Fans intended for use in ships shall function safely under the conditions with the ship rolling up to a maximum inclination of 22°30' from the normal position.

4. GENERAL NOTES ON TESTS

4.0 4 of IS : 302-1979* is applicable except as follows:

---

*General and safety requirements for household and similar electrical appliances (*fifth revision*).

†Electrical installations in ships: Part 1 General, Section 1 Definitions and general requirements.

4.1 Individual fan specification may include the sampling procedure for acceptance tests in place of Appendix B.

4.7, 4.8 and **4.12** Not applicable.

Additional Sub-clauses:

4.101 Fans are tested after installation of the accessories normally supplied with them.

4.102 Fans marked with degrees of protection against moisture are tested accordingly. Otherwise they are tested as fans belonging to 'ordinary class' regarding protection against moisture.

5. RATING

5.0 5 of IS : 302-1979* is applicable except that **5.2.2.2** and **5.2.3** are not applicable.

6. CLASSIFICATION

6.0 6 of IS : 302-1979* is applicable except that **6.1**(b)(4) is not applicable.

7. MARKING

7.0 7 of IS : 302-1979* is applicable except that references to heating element and symbols for water-tight construction are not applicable. Also the instruction sheet which accompanies the fan shall contain the clear instruction regarding mounting of the fan. Where applicable, the minimum mounting height shall be specified.

8. PROTECTION AGAINST ELECTRIC SHOCK

8.0 8 of IS : 302-1979* is applicable except as follows:

8.1 Addition:

Fans are tested after they are fixed in accordance with the manufacturer's instructions.

8.2 and **8.4** Not applicable.

9. STARTING

9.0 9 of IS: 302-1979* is applicable with the additional provision that if a regulator is supplied, it is set at the most unfavourable speed position for starting.

---

*General and safety requirements for household and similar electrical appliances (*fifth revision*).

10. INPUT AND CURRENT

10.0 10 of IS : 302-1979* is applicable except as follows:

10.1 Replacement:

The fan is connected to supply at the test voltage and at the highest speed setting of the regulator with the associated capacitor, if any, in circuit. In the case of fans provided with shutters and adjustable diaphragms, the test is conducted with shutters and adjustable diaphragms in the open position. The input measured under these conditions shall not exceed the marked input by more than 10 percent.

10.3 Not applicable.

11. TEMPERATURE-RISE

11.0 11 of IS : 302-1979* is applicable except that **11.4** and **11.6** are not applicable.

12. OPERATION UNDER OVERLOAD CONDITIONS OF APPLIANCES WITH HEATING ELEMENTS

12.0 12 of IS : 302-1979* is not applicable.

13. ELECTRICAL INSULATION AND LEAKAGE CURRENT AT OPERATING TEMPERATURE

13.0 13 of IS : 302-1979* is applicable except that:

13.1 Paras 3 and 5 of **13.2.1**(b) (2), Fig. 6 and 7 are not applicable.

14. RADIO AND TELEVISION INTERFERENCE SUPPRESSION

14.0 14 of IS : 302-1979* is applicable.

15. MOISTURE RESISTANCE

15.0 15 of IS : 302-1979* is applicable except as follows:

15.2 Addition:

For window fans and partition type fans intended to be mounted in outer walls, the outside part only is subjected to the splash test. The

---

*General and safety requirements for household and similar electrical appliances (*fifth revision*).

window fan is mounted in a plate of glass or similar material in accordance with the manufacturer's instructions. The plate shall be sufficiently large to avoid the inside part of the window fan being sprayed. The thickness of the plate shall be the one giving the most unfavourable results. The plate with the window fan is placed in the vertical position or the most unfavourable position allowed by the manufacturer's instructions.

15.2.4 Not applicable.

15.3 Not applicable.

15.4 Addition:

The sample of fan for use in ship is kept in the cabinet for 7 days.

16. INSULATION RESISTANCE AND ELECTRIC STRENGTH (AFTER HUMIDITY TREATMENT)

16.0 **16** of IS : 302-1979* is applicable except that **16.2** is not applicable.

17. OVERLOADS PROTECTION

17.0 **17** of IS : 302-1979* is applicable.

18. ENDURANCE

18.0 **18** of IS : 302-1979* is applicable with the provisions as follows:

a) Reference to short time or intermittent operations are not applicable.

b) The fans do not fall under the category of appliances having prospective total operating time less than 15 hours a year.

19. ABNORMAL OPERATION

19.0 **19** of IS : 302-1979* is applicable except as follows:

19.1 Paras 2, 3, 4 and 6 are not applicable.

Addition:

Fans are tested with the regulator and the louvres adjusted to the most unfavourable position. For fans provided with shutters, they are tested with the shutters closed if the fan can be operated under such conditions:

---

*General and safety requirements for household and similar electrical appliances (*fifth revision*).

The most unfavourable position would include:

a) most unfavourable condition in the fan, and

b) most unfavourable condition in the regulator.

19.2 to **19.5** inclusive Not applicable.

19.6 Paras 1 to 4 inclusive.

Replacement:

A stalled-motor test is made by locking the moving parts.

Fans incorporating motors having capacitors in the circuits of an auxiliary winding are operated once with the motor locked and a second time with the capacitor short-circuited (one fault at a time).

19.7 Not applicable.

19.8 Addition:

The load is applied without removing fan blade or restricting the air flow.

NOTE — Fans are liable to be operated continuously while unattended.

19.9 Not applicable.

20. STABILITY AND MECHANICAL HAZARDS

20.0 20 of IS : 302-1979* is applicable except as follows:

20.1 Addition:

If a fan has a clamping device, moving part is kept at the most unfavourable position or range.

For table fans intended to be used in ships at a surface such as floor table, the test is carried out with angle of inclination or tilt of 22°30'.

20.2 After para 2

Addition:

Where the contact with fan blades would be liable to cause personal injury, the fan shall have a suitable robust guard to provide, in normal use, adequate protection against personal injury.

This requirement does not apply to fans specifically designed for mounting above 2·3 m from the floor and which are unsuitable for standing on a horizontal surface.

---

*General and safety requirements for household and similar electrical appliances (*fifth revision*).

Fans shall comply with the following requirements:

a) Fans having:

   1) a hardness measured at the leading edge of the fan blade greater than 70 Rockwell, or

   2) an output greater than 6 W, or

   3) a peripheral speed exceeding 30 m/s, or

   4) the product of the Rockwell hardness value, output and peripheral speed that exceds 7 600, or

   5) sharp leading edges

   shall be guarded.

   The guard shall be such that it shall not be possible to touch the leading edges of the fan blades with the standard test finger (*see* Fig. 1 of IS : 1401-1970*) when applied with a force of 5 N.

b) Fans other than those covered by (a) above, (c) and (d) below shall have leading edges and tips smooth, and shall be guarded.

   The guards shall be such that it shall not be possible to touch the leading edge of the blade with a 25 mm diameter rod when applied radially, or in any direction where the air enters the impeller.

c) Fans having blades with leading edges and tips smooth and having:

   1) blade materials having a hardness less than D 60 Shore, or

   2) an output less than 2 W, or

   3) a peripheral speed of less than 15 m/s need not be guarded.

d) Cross flow fans with a motor of less than 50 W input rating do not require guarding.

NOTE 1 — The Rockwell hardness values given at item (a) (1) above are based on a nominal value of 60 Rockwell but take account cf the normal manufacturing tolerances of plastic materials.

NOTE 2 — A radius of not less than 0"5 mm is considered smooth. Flash edges of mouldings are considered to be sharp edges.

NOTE 3 — Peripheral speed and shaft output are measured with the fan operating at rated voltage or at the upper limit of rated voltage range.

Protective enclosures, guards and the like shall have adequate mechanical strength. They shall not be removable without the aid of a tool, or where clips are provided to fasten guards, a minimum force of 15 N in any direction shall be required to remove the clips for separating

---

*Specification for accessibility test probes (*first revision*).

the two parts of the guard. In addition, the guards shall be subjected to a push and pull test of 20 N. The push as well as the pull shall be applied only once in line with the axis of the fan motor. After the test, the guard shall not be damaged or displaced to an extent which impairs safety against mechanical hazards. The standard test finger test or 25 mm diameter rod test shall be repeated after the push and pull test.

Additional Sub-clause:

20.101 In fans provided with an oscillating mechanism, means shall be provided to ensure that the fan is not stalled or overturned if the oscillating mechanism is impeded.

Compliance is checked by inspection and by a test.

21. MECHANICAL STRENGTH

21.0 21 of IS : 302-1979* is applicable except that **21.1** is not applicable to ceiling or deckhead type fans.

Additional Sub-clause:

21.101 Fan Mounting System — The suspension system of ceiling fans shall be secure.

Compliance is checked by the following tests:

The ceiling fans are affixed to the ceiling according to the manufacturer's instructions. A load of 10 times the weight of the whole fan is applied to the body of the fan. The suspension system shall not break during the test.

Following this test, a torque of 1 Nm is applied to the fixed body of the fan. The suspension system shall not break during this test.

For both of these tests, the load is applied gradually and maintained for 1 min.

22. CONSTRUCTION

22.0 22 of IS : 302-1979* is applicable except as follows:

22.2 Replacement:

Fans shall have the appropriate degree of protection as marked. If not marked, they are considered as fans belonging to 'ordinary class' regarding protection against moisture.

---

*General and safety requirements for household and similar electrical appliances (*fifth revision*).

Compliance is checked by inspection and by the relevant tests.

22.10 Addition:

In case lifting handles are provided, they are subjected to gradually applied load of 4 times the weight of the fan. No damage to the fan or its lifting means shall result from this test.

22.22, 22.24, 22.25, 22.26 and **22.29** Not applicable.

Additional Sub-clause:

22.101 Fans designed to be secured to a rigid surface shall have means of mounting that shall not work loose due to transient torques, vibrations or normal handling.

22.102 The blade and blade carriers shall be securely fixed so that they do not loosen in operation.

Compliance is checked by the test of **18.**

23. INTERNAL WIRING

23.0 23 of of IS : 302-1979* is applicable.

24. COMPONENTS

24.0 24 of IS : 302-1979* is applicable except that **24.4** is not applicable.

25. SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CABLES AND CORDS

25.0 25 of IS : 302-1979* is applicable with the additional provision as follows:

25.4 Type Z attachment is permissible for portable fans only.

25.6 For rated current up to 3A, a nominal cross-sectional area 0·5 mm^2 supply cord is allowed provided the length of the cord does not exceed 2 m.

26. TERMINALS FOR EXTERNAL CONDUCTORS

26.0 26 of IS : 302-1979* is applicable.

27. PROVISION FOR EARTHING

27.0 27 of IS : 302-1979* is applicable.

---

*General and safety requirements for household and similar electrical appliances (*fifth revision*).

28. SCREWS AND CONNECTIONS

28.0 **28** of IS : 302-1979* is applicable.

29. CREEPAGE DISTANCES AND CLEARANCES

29.0 **29** of IS : 302-1979* is applicable.

30. RESISTANCE TO HEAT, FIRE AND TRACKING

30.0 **30** of IS : 302-1979* is applicable.

31. RESISTANCE TO RUSTING

31.0 **31** of IS : 302-1979* is applicable with the provision that fans for use in ships when subjected to salt-mist test (*see* **31.101**) after assembling in the manner in which the fan is to be used, there shall be no rusting of parts, the rusting of which might impair safety.

Additional Sub-clause:

31.101 Salt-Mist Test (Applicable to Fans for Use in Ships)

Test Chamber — The chamber for this test shall be made of such materials that they do not influence the corrosive effects of the salt mist.

The detailed construction of the chamber including the method of producing mist is optional, provided that:

a) the conditions in the chamber are within the specified limits;

b) a sufficiently large volume with constant, homogeneous conditions (not affected by turbulence) is available; these conditions should not be influenced by the presence of the specimens;

c) no direct spray impinges upon the specimens under test; and

d) drops of liquid accumulating on ceiling, walls or other parts cannot drip on the specimens.

Salt Mist — The solution for producing the salt mist shall be prepared by dissolving 50 ± 1 g of sodium chloride ($NaCl$), analytical reagent quality in distilled or demineralized water to make up 1 ± 0·02 litre of final solution at 20°C; if the *p*H does not lie between 6·5 and 7·2, the solution shall be rejected.

Correction of *p*H with hydrochloric acid or sodium hydroxide is allowed provided the concentration of $NaCl$ remains within the limits prescribed in this clause.

---

*General and safety requirements for household and similar electrical appliances (*fifth revision*).

The solution shall have a temperature equal to that in the chamber.

The sprayed solution shall not be re-used.

If an auxiliary air supply is used to produce the salt mist, the air shall:

a) have a temperature equal to that in the chamber,
b) be free from impurities which have a noticeable effect on the test, and
c) be saturated with water vapour at a temperature equal to that in the chamber.

The size of the droplets and the density of the mist are not prescribed for the time being.

Initial Examination — The fan shall be visually inspected before starting the test.

Conditioning — The temperature in the test chamber shall be maintained at 35 ± 2°C.

The test chamber shall remain closed and the spraying of the salt solution shall continue without interruption during the whole conditioning period.

The conditioning time shall be 24 hours.

Recovery — The fan shall be brushed and washed in running tap water for 5 min, rinsed in distilled or demineralized water, then shaken by hand to remove droplets of water and stored under standard recovery conditions for not less than 1 hour and not more than 2 hours.

Evaluation — The fan shall be visually inspected.

Summary — Reports on this test shall include information on the duration of the exposure and the orientation in the test chamber.

32. RADIATION HAZARDS

32.0 32 of IS : 302-1979* is applicable.

33. FINISH

33.0 33 of IS : 3024979* is applicable.

APPENDIX A

TABLE OF TYPE TESTS

Appendix A of IS : 302-1979* is applicable except that tests at serial No. 6 and 16 are not applicable.

---

*General and safety requirements for household and similar electrical appliances (*fifth revision*).

APPENDIX B

SAMPLING PROCEDURE FOR ACCEPTANCE TESTS

Appendix B of IS : 302-1979* is not applicable. Individual fan specification will specify acceptance tests for the particular type of fan and may include a recommended sampling procedure.

APPENDIX C

ELECTRONIC CIRCUITS

Appendix C of IS : 302-1979* is applicable if electronic circuits or components are used in the fans.

APPENDIX D

MEASUREMENT OF TEMPERATURE WITH THERMOMETER

Appendix D of IS : 302-1979* is applicable.

APPENDIX E

ALTERNATIVE TESTS FOR PROTECTED MOTOR UNITS

Appendix E of IS : 302-1979* is applicable.

APPENDIX F

IMPACT TEST APPARATUS

Appendix F of IS : 302-1979* is applicable except that.it is not applicable to ceiling and deck type fans.

---

*General and safety requirements for household and similar electrical appliances (*fifth revision*).

APPENDIX G

THERMAL CONTROLS AND OVERLOAD RELEASES

Appendix G of IS : 302-1979* is not applicable.

APPENDIX H

MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES

Appendix H of IS : 302-1979* is applicable.

APPENDIX J

TEST FOR FIRE-RESISTING PROPERTIES

Appendix J of IS : 302-1979* is applicable.

APPENDIX K

BNF JET TEST FOR DETERMINATION OF THICKNESS OF COPPER AND NICKEL PLATING

Appendix K of IS : 302-1979* is applicable.

APPENDIX L

APPROXIMATE MEASUREMENT OF THICKNESS OF CHROMIUM ON NICKEL, STEEL AND COPPER

Appendix L of IS : 302-1979* is applicable.

---

*General and safety requirements for household and similar electrical appliances. (*fifth revision*).